

BIOTERRORISM: The Challenge

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What Would You Do?

- ***NEWS FLASH!!*** A cell of 4 Terrorists crossing into Washington D.C. from Canada detonated two fragmentation bombs releasing unknown aerosolized agents. One release was at the entry gate to Andrews AFB in Maryland and the second occurred at the FBI Headquarters downtown.

What Would You Do?

- People near the explosions report numerous injuries from the flying debris. Many saw “a thick grey cloud of smoke and gas”. Some people near the explosions are complaining of breathing problems, nausea and a racing pulse.
- The CDC has placed local physicians on alert and has told them to be ready to treat “patients with unusual symptom complexes over the next days to weeks”.

What Would You Do?

- Would you evacuate your family? If so, would they let you stay? Do you go to the scene?
- Do you think it is all media-hype and everything will be fine?
- Who do you call? Do you close your office or offer extended hours? Do you brief your office personnel? Do you “decontaminate” all patients who show up? How do you do this?
- What additional equipment & references would you want to have? What medicines? Should everyone in your office wear a mask?

Objectives

- Define the threat of Bioterrorism.
- Recognize the hallmarks of a bioterrorist assault in patients and the community.
- Perform the first steps of effective triage and treatment after a bioterrorist assault.
- Understand the psychologic morbidity associated with a bioterrorist assault.
- Be cognizant of helpful resources.

What is Bioterrorism?

- The use of biologic organisms, (viruses/bacteria) or toxins to inflict casualties to help advance a sociopolitical agenda.
- The use may be actual OR threatened.
- It is not the use of chemical, nuclear, or conventional weapons.

Historical Examples

- Deliberate use of microorganisms and toxins as weapons has occurred since ancient times.
 - curare as arrow poisons (neolithic)
 - cadavers in H₂O supplies (medieval)
 - 14th cent siege of Kaffa (Ukraine)
catapulted cadavers dead from plague

Historical Events

- Smallpox used as a bio-terror weapon amongst the native Americans. British “gave” blankets contaminated w/ smallpox to hostile tribes 1763.
- WWI: Germany contaminated livestock
- WWII: Japan conducted 12 large scale field trials in Chinese cities using plague, cholera, anthrax, shigella and salmonella

Why is it a Challenge?

- Bioweapons are easily available, cheap and possess a high lethality versus other types of terrorist weapons.
- The U.S. and its “open” society is vulnerable to attack.
- The mere threat of a biologic attack can inspire disproportionate terror.

Ideal Bioweapon ?

- High infectivity (smallpox & anthrax)
- Aerosol transmissibility (smallpox & anthrax)
- High communicability (smallpox; NOT anthrax)
- High toxicity (smallpox & anthrax)
- Easy production (neither; botulinum toxin)
- Highly persistent (anthrax; NOT smallpox)
- No vaccine or anti-toxin available (neither)

Recognition

- We see only what we are “used” to seeing
- See not just the zebra, but the herd of zebras
- Four “Outs”: (AAFP 2001- Dr. J. Temte)
 - **Out** of season (flu-like illness in July)
 - **Out** of sequence (plague w/o rodent death)
 - **Out** of context (smallpox anywhere!!)
 - **Out** of range (morbidity rates too high)

Epidemiologic Clues

- 1. Large epidemic of the *same* disease in a very *discrete population*.
- 2. Many unexplained deaths or diseases.
- 3. Unusual routes of infection.
- 4. Unusual location or season for a disease.
- 5. Disease transmitted by a vector that is absent.

Epidemiologic Clues

- 6. Single case of an uncommon agent.
- 7. Disease in an unusual age group.
- 8. Similar genotype of organisms causing disease in geographically diverse sites.
- 9. A disease outbreak with simultaneous human and animal involvement.

Recognition

- Difficulties to Overcome w/ **Education**
 - Agents unfamiliar to most physicians
 - Incubation periods make it so that victims will present removed in time from release event
 - Presenting sx's & signs are non-specific
 - Many providers of care have not received any training in bio-defense and are as terrified as their patients!!

Consequences

- Catastrophic mass casualty situation
- Medical & psychologic casualties
- Family Physicians will be prime caregivers
 - Geographic diversity
 - Care to all ages/genders/problems
 - Patients trust us
 - Initial sxs typically nonspecific and bring pts. to their Family Physicians

What to do?

- “Ten Commandments of Management”
 - Cieslak & Henretig
 - (Military Medicine: 166, Suppl 2:11,2001)
 - How to provide prompt and effective care to victims of an attack by chemical agents.



10 Steps to Bio-Attack Care

1	Maintain an Index of Suspicion
2	Protect yourself
3	Assess the patient (primary survey)
4	Decontaminate as appropriate
5	Establish a working diagnosis
6	Render Prompt Treatment
7	Practice good infection control
8	Alert the proper authorities
9	Assist in the epidemiologic investigation

Step 1

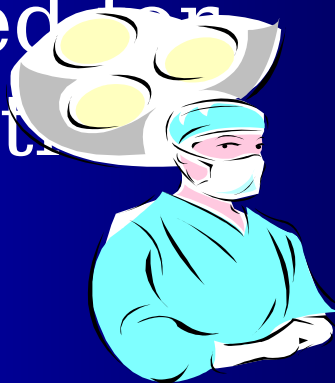
- Maintain a healthy index of suspicion
 - Certain bio-warfare diseases present in a characteristic fashion – know them:
ANTHRAX = widened mediastinum
SMALLPOX = pustular rash w/ peripheral to central
PLAGUE = hemoptysis (raspberry syrup)
BOTULISM = descending symmetric flaccid paralysis
 - Others present as a non-specific febrile illness (tularemia, brucellosis, Q-fever, Hemorrhagic fevers.)

Step 2 – Protect Yourself

- You are of little use if you are a casualty
- Vaccines available for anthrax/smallpox
- Simple surgical masks suffice in most situations.
- Only Plague, Smallpox and certain viral hemorrhagic fevers are even contagious!

Step 3 – Assess the Patient

- Brief – Take care of the ABC's and immediate life threatening injuries first.
- Consider need for Nerve agent or cyanide antidotes.
- Consider need for decontamination.



Step 4 - Decontaminate

- Most will NOT need this since biologic casualties typically present days to weeks after a release and have washed and changed clothes many times eg: self-decon
- Exceptions are care of pts near “ground-zero”
 - soap & water and routine laundry are adequate for biologic agents

Step 5 – Working Diagnosis

- Thorough history and physical
- Collect blood, sputum, nasal swabs
- Emphasize syndromic diagnosis and an expedient algorithmic approach. (Cieslak et al. Military Medicine 165, 9:659. 2000)
- Respiratory vs neuromuscular sx's?
- Rapid onset vs. delayed onset of sx's?

Syndromic Diagnosis - full

<u>Rapid onset respiratory</u> Nerve agents Cyanide, mustard, phosgene, lewisite	<u>Delayed onset resp.</u> Anthrax, Plague, ricin Tularemia, Q fever, Chem , Staph toxin B
<u>Rapid onset neuro</u> Nerve agents Cyanide	<u>Delayed onset neuro</u> Botulism

Syndromes for which Tx is critical & possible

<u>Rapid onset respiratory</u> 1.) Nerve agents 2.) Cyanide	<u>Delayed onset resp</u> 1.) Anthrax 2.) Plague 3.) Tularemia
<u>Rapid onset neuro</u> 1.) Nerve Agents 2.) Cyanide	<u>Delayed onset neuro</u> 1.) Botulism

Step 6 – Prompt Treatment

- In most cases this is empiric therapy based on a syndromic diagnosis while awaiting definitive diagnosis.
- All non-viral agents respond to doxycycline
- Empiricism is the key to saving lives in a bio-terrorist event.
- Fever usually means infection

Agents

- 1.) Doxycycline 100mg IV or po bid
- 2.) Ciprofloxacin 400 mg IV bid
500 mg po bid
- 3.) Nerve agent antidote kit (N.A.A.K.-> atropine 2mg and pralidoxime 600mg) IM
- 4.) Diazepam 10 mg IM
- 5.) Na Nitrite 300 mg IV + Na thiosulfate 12.5g IV

Syndromic Approach to Tx

<p><u>Rapid onset respiratory</u></p> <p>NAAK x 3 +diazepam</p> <p>If no response: Cyanide antidote</p>	<p><u>Delayed onset resp</u></p> <p>Doxycycline or Cipro</p>
<p><u>Rapid onset Neuro</u></p> <p>NAAK x 3 + diazepam</p>	<p><u>Delayed onset neuro</u></p> <p>Evaluate for botulism anti-</p>

Step 7 – Infection Control

- Fairly simple!
- Standard precautions for all:
- Add droplet precautions for Plague (masks)
- Add contact precautions for viral hemorrhagic fevers. (glove & gown)
- Add airborne precautions for Smallpox (HEPA-masks/negative flow rooms)

Step 8 – Alert Authorities

- Alert authorities so outbreak control measures can be instituted
- Local and/or State Health Departments
- In most hospitals this chain can be started with the Infection Control office.
- Your job is to notify – then care for pts.
Their job is to investigate w/ your help.

Step 9 – Assist in Epidemiologic Investigation

- The most important thing you can do is to keep track of names/numbers of actual and suspected casualties based on your syndromic diagnoses.
- The key is to establish the denominator. Eg how many were exposed in order to help plan the level of response needed.

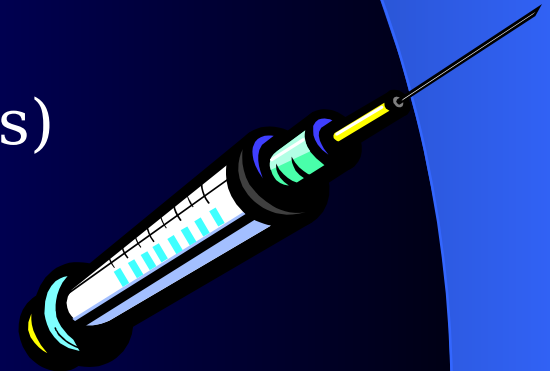
Step 10 – Know & Spread Information

- Get training – and once trained – help others to understand the basics.
- Key resources:
 - Tel# 1-888-872-7443 US Army Research Institute of Infectious Diseases (USAMRIID)
 - Print: The “Blue Book” Medical Management of Biologic Casualties. 4th Edition – also downloadable and CD-ROM versions

Resources

- WEB/INTERNET

- www.usamriid.army.mil (Dx and Tx, disease information, courses, blue and red books, tel #)
- www.bt.cdc.gov (disease reporting/consensus statements on Tx, FAQ's, news updates)
- www.jama.ama-assn.org (articles)



Psychologic Morbidity

- Terrorism succeeds when it inspires mass terror – indeed the psychologic morbidity of even a small bioterrorist event may lead to more dire consequences than the actual agent released.
- Family Physicians are the keys to a calm and successful “treatment” for terror

Psychologic Morbidity

- Etiology:
 - Instantaneous worldwide communication
 - The intense adrenergic arousal engendered by fear can induce symptoms that are misattributed as disease.
 - Concept of infection by an odorless, invisible, silent microbe stimulates magical thinking and creates terrifying mental images.

Psychologic Morbidity

- Etiology (cont.):
 - Interventions used to respond to bioterrorism can engender terror.
 - Quarantine, mass immunization, infection control garments, isolation
 - Confusion regarding terms.
 - Infectious is not the same as contagious

Psychologic Morbidity

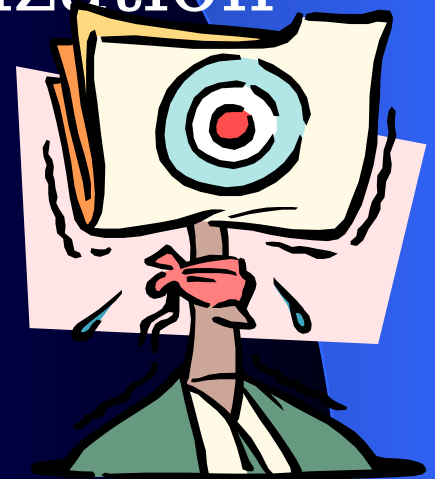
- Examples: NEJM 2000.342: 96-100
“Mass psychogenic illness attributed to toxic exposure at a high school”
A teacher noted a gasoline like smell and began to develop nausea and SOB
Soon, 80 students & 19 Staff evaluated in the local ED w/ 38 hospitalized.
When school reopened 5 days later 71 more reported to the ED.
Huge investigation found no exposures

Psychologic Morbidity

- Surat, India 1994 - small outbreak of plague produced a mass exodus of 600,000 people and general panic. This exodus *included medical personnel*.
- The mortality and morbidity were a direct result of the panic – not the plague.
- India lost \$3-4 billion in 3 weeks due to an international economic boycott.

Psychologic Morbidity

- Likely Occurrences:
 - Anxiety & panic attacks
 - Acute Stress Reactions & PTSD
 - Psychogenic illness/somatization
 - depression
 - substance abuse
 - dissociation



Psychologic Morbidity

- Keys to Treatment & Response

Norwood et al. Mil Med 166;2:27-8. 2001

1. Good medical care for illness
2. Accurate risk communication (esp. media)
3. Management of misattributed symptoms
4. Encourage return to normal social roles and usual sources of social support. Move patients out of patient role ASAP.

Psychologic Morbidity

- 5. Education & training for all health personnel to include admin staff.
- 6. Utilize mental health expertise to help with differentiation of somatic illness from organic illness and depression from somatization.
- 7. Parental fears for their children must be addressed.
- 8. Engage patients in mundane tasks.

Conclusions

- Become informed – not afraid!!
- Recognition of a biologic assault starts with us – it will not be obvious at first.
- Use the “10-Steps” and syndromic diagnosis to help sort through chaotic clinical situations.
- Information and social re-integration are keys to psychologic management

Homework-The Challenge Answered!

- 1.) Get the “ Blue Book” from USAMRIID.
- 2.) Establish your internet bookmarks.
- 3.) Record phone numbers and addresses for your local and state health departments
- 4.) Study/ learn about the features of the major bio-terrorism agents.
- 5.) Learn to manage psychologic Sxs

Questions?

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